

*Application No. 10/628,738
Amendment dated June 29, 2007
Reply to Office Action of April 4, 2007*

REMARKS

This amendment is responsive to the Office Action mailed April 4, 2007 in connection with the above-identified patent application. In that action, claims 1, 6, 8-9, 15, 18-19, 24, 29, 31-32, 34-36, 38-40, and 42 were rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,793,979 to Lichtman, et al. (hereinafter "Lichtman"). Claims 2-5, 7, 16-17, 20-23, 25-28, 30, 33, 37, and 41 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Lichtman in view of U.S. Patent No. 6,016,500 to Waldo, et al. (hereinafter "Waldo"). The Action was made final.

THE § 102(b) ART REJECTIONS

As noted above, each of independent claims 1, 24, 36 and 40 (and their respective dependent claims) stand rejected as being anticipated by Lichtman.

Claims 1, 24, 36 and 40 and Their Respective Dependent Claims are in Condition for Allowance:

Regarding claims 1, 24, 36 and 40, the current Office Action states that Lichtman discloses a method and an article of manufacture comprising a program storage medium readable by a computer and embodying one or more instructions of a resource allocation module executable by the computer to perform a method of releasing resources of a user session operating in a software environment that includes an automatic memory management algorithm executed by a garbage collector. Thereafter, with reference to a limitation reciting "using the resource deallocation module, detecting an impending execution of the automatic memory management algorithm", the Office Action cites column 43, lines 11-14 of Lichtman: "In response to a 'deallocate' instruction by the configuration manager 158, the assignment element deletes the resource assignments in the assigned resource table 304 for the designated device 20." The Office Action then asserts that this is equivalent to "using the resource deallocation module, detecting an impending execution of the automatic memory management algorithm."

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Applicants respectfully disagree. For example, with reference to independent claim 1, as amended, the method claimed is used in a server application environment. In such an environment, a separate user session is opened for each user who accesses the server, and the user session expires when the user logs out, closes the browser, or otherwise disengages from the server. When the session expires, the user session objects should be collected by the garbage collector to free up memory that is no longer used by or needed for the session. However, objects containing obsolete references might not be collected because of these obsolete references (page 1, lines 7-16). The subject claim recites a method to release these obsolete references prior to execution of the automatic memory management algorithm utilized by the garbage collector so that the garbage collector can collect the user session objects as intended. Thus, claim 1, as amended, recites as the first limitation "using the resource deallocation module, detecting an impending execution of the automatic memory management algorithm by the garbage collector for removing a session object created for the user session, wherein said session object of the user session is not referenced by a remaining object and which does not reference one or more external resources". This limitation, as amended, recites detecting impending execution of the automatic memory management algorithm in order that the remaining steps of the claimed method are performed prior to execution of the garbage collector. The limitation further recites that the automatic memory management algorithm is being executed to remove session objects created for the user session which are not referenced by a remaining object and which does not reference external resources.

The actions of Lichtman's assignment element cited in the Office Action are in response to a 'deallocate' instruction by the configuration manager as noted by the Examiner. This is somehow interpreted in the Office Action to being equivalent to detecting an impending execution of the automatic memory management algorithm. However, Applicants respectfully disagree because there does not appear to be any step of detecting of an impending execution described or suggested in the Lichtman reference. The cited assignment element 302, as shown in Figures 6 and 12, is part of an arbitrator 154 which operates under control of a configuration manager 158. As

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described in col. 31, lines 11-13, "The arbitrators 154 work in tandem with the configuration manager 158 to complete the allocation and assignment of resources 14 to the devices 20." The configuration manager does not detect impending execution of the arbitrator, but instead controls execution of it. Therefore, Applicants respectfully submit that Lichtman does not teach or suggest the recited step of detecting an impending execution.

Further, the concept of a garbage collector for objects created for a user session does not appear to be discussed in the Lichtman reference. The assignment element referenced in the Office Action simply assigns a resource element for use by the associated devices upon being provided resource element information related to an attached device (col. 42, lines 15-22). And then, It simply adds the assigned resource element as an entry to an assignment table" (col. 42, lines 26-28). Assigning resources for an attached device is significantly different than allocating resources or objects for a user session that can dynamically request and release various resources during execution of the session. It would seem that, at best, devices can identify themselves and declare their services and resource requirements to the computer, but reserving those resources is left to the operating system, or device drivers operating on the device's behalf (col. 3, lines 7-15). When a device is removed or made inoperative, the assignment element simply removes one or more entries from the assigned resource table in response to a "deallocate" instruction by the configuration manager 158 (col. 43, lines 7-12). These allocations and deallocations are unrelated to user sessions operating in the software environment of the computer, but are only related to the installation of devices on the computer. Claim 1, as amended, recites in the first step, a limitation referring to a garbage collector for removing session objects created for a user session. Applicants submit that the Lichtman reference does not teach or suggest this recited limitation.

The Office Action then cites col. 40, lines 36-40 of Lichtman, wherein the configuration manager instructs the arbitrators to free the resource elements assigned to the removed device, wherein the resource elements previously assigned for use by the removed device become available for use by other devices of the computer as

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required by future configuration operations. The Office Action states that this is interpreted to be equivalent to the recited limitation of "responsive to the detecting, accessing, by the resource deallocation module, an object of the user session." Applicants again respectfully disagree. Rather than accessing the device, Lichtman, to the contrary, teaches terminating access to the device (col. 40, lines 32-34) and, as described above, the assignment element simply removes assigned resource elements from the assigned resource table.

With reference to the identifying and releasing steps recited in claim 1, it should be noted that the present application and the steps recited in the claims are directed to a situation where a user session fails to properly dereference one or more system resource references, which leads to objects containing obsolete references that inhibit or prevent their removal by the garbage collector. For this reason, the identifying step of claim 1, as amended, recites identifying obsolete references wherein have not been released by the object of the user session. The Lichtman reference neither teaches nor suggests this recited feature.

Applicant notes that each of claims 24, 36 and 40, as amended, recite limitations similar to the discussed limitations of claim 1, as amended.

In accordance with the above, because the Lichtman reference does not teach each and every limitation of the subject claims, Applicants respectfully submit that each of independent claims 1, 24, 36 and 40, and their respective dependent claims, are patentably distinct and not anticipated by the reference of record.

Claims 15 and 39 and Their Respective Dependent Claims are in Condition for Allowance:

Briefly, in rejecting claims 15 and 39, with particular reference to the recitation of "an object graph defining an interrelationship between objects of said user session", the Office Action cites column 15, lines 54-64, and column 40, lines 44-67, of Lichtman. The Lichtman reference discloses that an enumerator responds to an enumerate instruction by collecting device information from each of the devices on an affected system bus and for a newly installed device. A device node corresponding to this device is added to the

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hardware tree and, if the new device represents a component which has not been previously installed, this new device information is stored in the registry and upon completion of the enumeration task, appropriate device drivers are identified for use with the detected devices and the elements for the resources are subsequently allocated and the identified device drivers are loaded. The Office Action states that these teachings of the Lichtman reference are interpreted to be equivalent to "an object graph defining an interrelationship between objects of said user session."

Applicants respectfully traverse this interpretation of the Lichtman reference. The Examiner has not shown where the Lichtman reference teaches an interrelationship between the devices. The objects of the user session in the present application clearly can have an interrelationship. For example, as recited in claims 15 and 39, as amended, the automatic memory management garbage collector module removes objects which are not referenced by one of the remaining objects, and which does not reference an allocated external resource. These interrelationships can be complex as discussed in the Background of the present application: "In one common situation, a programmer fails to properly dereference one or more system resource references, such as file handles, database connections, sockets, threads, or the like. This leads to objects containing obsolete references that inhibit or prevent their removal by the garbage collector. Moreover, in addition to not collecting the object containing the obsolete references, the garbage collector will be inhibited or prevented from collecting any objects referenced by the object containing these obsolete references. In this way, a few obsolete references can lead to a large number of uncollected objects." The Examiner has not shown where the Lichtman reference teaches that the devices can have any interrelationship. In fact, the Lichtman reference describes a method of installing devices so that they are conflict-free with respect to the resources they require (col. 1, lines 19-22). Applicants respectfully submit that the simple tables described in the Lichtman reference only list resources used by each device and do not describe an interrelationship between the devices.

Claims 15 and 39, as amended, also recite limitations for a resource deallocation module and an automatic memory management garbage collector module. In particular,

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the resource deallocation module has been amended to recite limitations regarding "obsolete allocated external resources." Further, the automatic memory management garbage collector module has been amended to recite a limitation for "removing each of said one or more objects which is not referenced by a remaining of said one or more objects and which does not reference one or more of said allocated external resources." Similar recited limitations have been discussed above with reference to claims 1, 24, 36 and 40. Applicants therefore respectfully repeat the arguments presented above and submit that these amended limitations of claims 15 and 39 serve to further distinguish the subject claims over the cited reference.

In accordance with the above, because the Lichtman reference does not teach each and every limitation of the subject claims, Applicants respectfully submit that each of independent claims 15 and 39, and their respective dependent claims, are patentably distinct and not anticipated by the reference of record.

THE § 103(a) ART REJECTIONS

As noted above, each of dependent claims 2-5, 7, 16-17, 20-23, 25-28, 30, 33, 37, and 41 stands rejected as being unpatentable over Lichtman in view of Waldo.

Claims 2-5, 7, 16-17, 20-23, 25-28, 30, 33, 37, and 41 are in Condition for Allowance:

Independent claims 1, 15, 24, 36, 38 and 40 from which the subject claims respectively depend have each been discussed above with reference to the § 102(b) rejections. Applicants submit that neither the Lichtman reference nor the Lichtman reference in combination with the Waldo reference teach the recited features of the independent base claims, as amended. Applicants therefore respectfully submit that dependent claims 2-5, 7, 16-17, 20-23, 25-28, 30, 33, 37, and 41 are in condition for allowance.

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CONCLUSION

In view of the above amendments, comments, and arguments presented, applicants respectfully submit that all pending claims (claims 1-9 and 15-42) are patentably distinct and unobvious over the art of record.

Allowance of all pending claims and early notice to that effect is respectfully requested.

Respectfully submitted,

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29 JUN 07
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